CLAIMS

What is claimed is:

1. An isolated polypeptide comprising:

a first C1q domain comprising a sequence of SEQ ID NO:3, 10 beta strands corresponding to amino acid residues 31-35, 52-54, 60-63, 67-69, 73-84, 89-95, 101-108, 112-126, 131-136 and 150-154 of SEQ ID NO:2, and a cysteine residue corresponding to residue 70 of SEQ ID NO:2; and

a second C1q domain joined to the carboxy terminal of said first C1q domain, said second C1q domain comprising a sequence of SEQ ID NO:3, 10 beta strands corresponding to amino acid residues 179-183, 206-208, 214-217, 221-223, 227-238, 243-249, 254-262, 267-278, 283-288 and 305-309 of SEQ ID NO:2, and a cysteine residue corresponding to residue 223, a glycine residue corresponding to residue 228 of SEQ ID NO:2.

2. An isolated polypeptide according to claim 1, further comprising a secretory signal sequence.

3. An isolated polypeptide according to claim 2, where said secretory signal sequence comprises amino acid residues 1-16 of SEQ ID NO:2

4. An isolated polypeptide comprising a sequence of amino acid residues that is at least 80% identical in amino acid sequence to residues 17 to 329 of SEQ ID NO:2, wherein said sequence comprises:

a first C1q domain comprising a sequence of SEQ ID NO:3, 10 beta strands corresponding to amino acid residues 31-35, 52-54, 60-63, 67-69, 73-84, 89-95, 101-108, 112-126, 131-136 and 150-154 of SEQ ID NO:2, and a cysteine residue corresponding to residue 70 of SEQ ID NO:2; and

a second C1q domain joined to the carboxy terminal of said first C1q domain, said second C1q domain comprising a sequence of SEQ ID NO:3, 10 beta strands corresponding to amino acid residues 179-183, 206-208, 214-217, 221-223, 227-238, 243-249, 254-262, 267-278, 283-288 and 305-309 of SEQ ID NO:2, and a cysteine residue corresponding to residue 223, a glycine residue corresponding to residue 228 of SEQ ID NO:2.

5. An isolated polypeptide according to claim 4, wherein said polypeptide is at least 90% identical in amino acid sequence to residues 17 to 329 of SEQ ID NO:2.

6. An isolated polypeptide of claim 5, wherein the amino acid percent identity is determined using a FASTA program with ktup=1, gap opening penalty=10, gap extension penalty=1, and substitution matrix=blosum62, with other parameters set as default.

7. An isolated polypeptide according to claim 5, wherein any differences between said polypeptide and SEQ ID NO:2 are due to conservative amino acid substitutions.

8. An isolated polypeptide according to claim 5, wherein said polypeptide specifically binds with an antibody that specifically binds with a polypeptide consisting of the amino acid sequence of SEQ ID NO:2.

9. An isolated polypeptide according to claim 5, wherein said first C1q domain comprises amino acid residues 17-159 of SEQ ID NO:2.

10. An isolated polypeptide according to claim 5, wherein said second C1q domain comprises amino acid residues 160-328 of SEQ ID NO:2.

11. An isolated polypeptide according to claim 5, wherein said polypeptide comprises residues 17-328 of SEQ ID NO:2.

12. An isolated polypeptide according to claim 4, covalently linked at the amino or carboxyl terminus to a moiety selected from the group consisting of affinity tags, toxins, radionucleotides, enzymes and fluorophores.

13. An isolated polypeptide comprising:

a signal sequence;

a first C1q domain comprising a sequence of SEQ ID NO:3, 10 beta strands corresponding to amino acid residues 31-35, 52-54, 60-63, 67-69, 73-84, 89-95, 101-108, 112-126, 131-136 and 150-154 of SEQ ID NO:2 and a cysteine residue corresponding to amino acid residue 70 of SEQ ID NO:2; and

a second C1q domain joined to the carboxy terminal of said first C1q domain, said second C1q domain comprising a sequence of SEQ ID NO:3, 10 beta strands corresponding to amino acid residues 179-183, 206-208, 214-217, 221-223, 227-238, 243-249, 254-262, 267-278, 283-288 and 305-309 of SEQ ID NO:2 and a cysteine residue corresponding to residue 223 of SEQ ID NO:2;

wherein said polypeptide specifically binds with an antibody that specifically binds with a polypeptide consisting of the amino acid sequence of SEQ ID NO:2.

14. An isolated polypeptide selected from the group consisting of:

a) a polypeptide consisting of amino acid residue 17 to amino acid residue 159 of SEQ ID NO:2 or

b) a polypeptide consisting of amino acid residue 160 to amino acid residue 329 of SEQ ID NO:2.

15. A fusion protein consisting essentially of a first portion and a second portion joined by a peptide bond, said first portion consisting of a polypeptide selected from the group consisting of:

a) polypeptide according the claim 1;

b) a polypeptide comprising the amino acid sequence of residues 17-159 of SEQ ID NO:2;

c) a polypeptide comprising the amino acid sequence of residues 160-329 of SEQ ID NO:2;

d) a polypeptide comprising the amino acid sequence of residues 17-329 of SEQ ID NO:2; and

said second portion comprising another polypeptide.

16. A polypeptide according to claim 1; in combination with a pharmaceutically acceptable vehicle.

17. A method of producing an antibody to a polypeptide comprising:

inoculating an animal with a polypeptide selected from the group consisting of:

a) polypeptide according to claim 1;

b) a polypeptide comprising the amino acid sequence of residues 17-159 of SEQ ID NO:2;

c) a polypeptide comprising the amino acid sequence of residues 160-329 of SEQ ID NO:2;

d) a polypeptide comprising the amino acid sequence of residues 17-329 of SEQ ID NO:2; and

e) a polypeptide or polypeptide fragment of SEQ ID NO:2; and

wherein said polypeptide elicits an immune response in the animal to produce the antibody; and

isolating the antibody from the animal.

18. An antibody or antibody fragment that specifically binds to a polypeptide according to claim 1.

19. An antibody according to claim 18, wherein said antibody is selected from the group consisting of:

a) polyclonal antibody;
b) murine monoclonal antibody;
c) humanized antibody derived from b); and
d) human monoclonal antibody.

20. An antibody fragment according to claim 18, wherein said antibody fragment is selected from the group consisting of F(ab'), F(ab), Fab', Fab, Fv, scFv, and minimal recognition unit.

21. An anti-idiotype antibody that specifically binds to said antibody of claim 18.

22. An isolated polynucleotide molecule encoding a polypeptide according to claim 1.

23. An isolated polynucleotide molecule according to claim 22, wherein said polypeptide further comprises a secretory signal sequence.

24. An isolated polynucleotide molecule according to claim 23, where said secretory signal sequence comprises amino acid residues 1-16 of SEQ ID NO:2

25. An isolated polynucleotide molecule encoding a polypeptide according to claim 4.

26. An isolated polynucleotide molecule according to claim 25, wherein said polypeptide is at least 90% identical in amino acid sequence to residues 17-329 of SEQ ID NO:2.

27. An isolated polynucleotide molecule of claim 26, wherein the amino acid percent identity is determined using a FASTA program with ktup=1, gap opening

penalty=10, gap extension penalty=1, and substitution matrix=blosum62, with other parameters set as default.

28. An isolated polynucleotide molecule according to claim 26, wherein any differences between said polypeptide and SEQ ID NO:2 are due to conservative amino acid substitutions.

29. An isolated polynucleotide molecule according to claim 26, wherein said polypeptide specifically binds with an antibody that specifically binds with a polypeptide consisting of the amino acid sequence of SEQ ID NO:2.

30. An isolated polynucleotide molecule according to claim 26, wherein said polynucleotide molecule remains hybridized following stringent wash conditions to a polynucleotide consisting of the nucleotide sequence of SEQ ID NO:1, or the complement of SEQ ID NO:1.

31. An isolated polynucleotide molecule according to claim 26, wherein said first C1q domain comprises amino acid residues 17-159 of SEQ ID NO:2.

32. An isolated polynucleotide molecule according to claim 26, wherein said second C1q domain comprises amino acid residues 160-329 of SEQ ID NO:2.

33. An isolated polynucleotide molecule according to claim 26, wherein said polypeptide comprises residues 17-329 of SEQ ID NO:2.

34. An isolated polynucleotide molecule encoding a polypeptide comprising:

a signal sequence;

a first carboxyl-terminal C1q domain comprising a sequence of SEQ ID NO:3, 10 beta strands corresponding to amino acid residues 31-35, 52-54, 60-63, 67-69, 73-84, 89-95, 101-108, 112-126, 131-136 and 150-154 of SEQ ID NO:2 and a cysteine residue corresponding to amino acid residue 70 of SEQ ID NO:2; and

a second carboxyl-terminal C1q domain comprising a sequence of SEQ ID NO:3, 10 beta strands corresponding to amino acid residues 179-183, 206-208, 214-217, 221-223, 227-238, 243-249, 254-262, 267-278, 283-288 and 305-309 of SEQ ID NO:2 and a cysteine residue corresponding to residue 223 of SEQ ID NO:2;

wherein said polypeptide specifically binds with an antibody that specifically binds with a polypeptide consisting of the amino acid sequence of SEQ ID NO:2, and

said polynucleotide molecule remains hybridized following stringent wash conditions to a polynucleotide consisting of the nucleotide sequence of SEQ ID NO:1, or the complement of SEQ ID NO:1.

35. An isolated polynucleotide molecule selected from the group consisting of,

a) a contiguous sequence of nucleotides from nucleotide 1 to nucleotide 1357 of SEQ ID NO:1;

b) a contiguous sequence of nucleotides from nucleotide 210 to nucleotide 1196 of SEQ ID NO:1;

c) a contiguous sequence of nucleotides from nucleotide 258 to nucleotide 1196 of SEQ ID NO:1;

d) a contiguous sequence of nucleotides from nucleotide 258 to nucleotide 686 of SEQ ID NO:1;

e) a polynucleotide encoding a polypeptide consisting of the sequence of amino acid residues 17 to 159 of SEQ ID NO:2;

f) a polynucleotide encoding a polypeptide consisting of the sequence of amino acid residues 160 to 329 of SEQ ID NO:2;

g) a polynucleotide encoding a polypeptide consisting of the sequence of amino acid residues 17 to 329 of SEQ ID NO:2;

h) a polynucleotide that remains hybridized following stringent wash conditions to a polynucleotide consisting of the nucleotide sequence of SEQ ID NO:1, or the complement of SEQ ID NO:1;

i) the nucleotide sequences complementary to a), b), c), d), e), f), g) or h) and

m) degenerate nucleotide sequences of e), f) or g).

36. An isolated polynucleotide molecule encoding a fusion protein consisting essentially of a first portion and a second portion joined by a peptide bond, said first portion is selected from the group consisting of:

a) a polypeptide according to claim 1;

b) a polypeptide comprising the amino acid sequence of residues 17-159 of SEQ ID NO:2;

c) a polypeptide comprising the amino acid sequence of residues 160-329 of SEQ ID NO:2; and

d) a polypeptide comprising the amino acid sequence of residues 17-329 of SEQ ID NO:2; and

said second portion comprising another polypeptide.

37. An isolated polynucleotide molecule consisting of the sequence of nucleotide 1 to nucleotide 987 of SEQ ID NO:4.

38. An expression vector comprising the following operably linked elements:

a transcription promoter;

a DNA segment encoding a polypeptide according to claim 1; and

a transcription terminator.

39. An expression vector according to claim 38, wherein said DNA segment encodes a polypeptide covalently linked at the amino or carboxyl terminus to an affinity tag.

40. An expression vector according to claim 38, wherein said DNA segment further encodes a secretory signal sequence operably linked to said polypeptide.

41. An expression vector according the claim 40, wherein said secretory signal sequence comprises residues 1-16 of SEQ ID NO:2.

42. A cultured cell into which has been introduced an expression vector according to claim 38, wherein said cell expresses said polypeptide encoded by said DNA segment.

43. A method of producing a protein comprising:

culturing a cell into which has been introduced an expression vector according to claim 38;

whereby said cell expresses said polypeptide encoded by said DNA segment; and

recovering said expressed protein.